

III REMARKS

A. Correction of Informalities as to claims 22–28 and 30–37

The examiner's reasons in support of these rejections are as follows:

Claims 22–28 and 30–37 are objected to because of the following informalities: Claims 22–28 and 30–37 are dependent from claims previously canceled in a preliminary amendment, which is improper. Appropriate correction is required.

(Action, page 2)

Claims 22–28 and 30–37 have been amended to correct the informalities identified for these claims. Accordingly, this objection has been addressed.

B. Response to Rejection of Claims 21, 25, 30 and 31 Under 35 U.S.C. § 112, Second Paragraph, as being Indefinite

The examiner's reasons in support of the rejection of claim 21 are as follows:

The statement set forth in Claim 21, lines 5 and 6, that "the [unsaturated] monomer-water soluble or water dispersible polysaccharide graft copolymer is depolymerized relative to the ungrafted polysaccharide" is not clear whether or not polymerization is intended as an additional step in the claimed method or as a process step, which is carried out simultaneously along with the irradiating step. The text "which is depolymerized to the ungrafted polysaccharide" does not flow with the previous text of Claim 21 or is not written as a process limitation for the claimed method.

(Action, page 2)

Claim 21 has been amended to indicate that the "depolymerization" is carried out during the same step (2) as the formation of the graft polymer. Claim 21 has been further amended to delete the words "which is depolymerized relative to the ungrafted polysaccharide." Support for the amendments is provided by the specification at paragraph 37. In view of these amendments to claim 21, the rejection has become moot and should be withdrawn.

The examiner's reasons in support of rejection of claims 25, 30 and 31 are as follows:

In Claims 25, 30 and 31, in the absence of the specific modifications to the chemical core claimed (cellulose) or distinct language to describe the structural modifications or the chemical names of the modified celluloses of this invention, the identity of said modified celluloses would be difficult to describe and the metes and bounds of said modified celluloses that Applicants regard as the invention cannot be sufficiently

determined because they have not been particularly pointed out or distinctly articulated in the claims.

(Action, page 2)

Claims 25, 30 and 31 have been have been amended to define the "modified cellulose" as a "cellulose containing at least one functional group." Support for the amendment is provided in the specification at paragraph 26. As the identity of "cellulose containing at least one functional group" can be ascertained by one of ordinary skill in the art, the rejection of the claims as indefinite is no longer tenable and should be withdrawn.

C. Response to Rejection of Claims 29–34 under 35 U.S.C. § 102(b) as being Anticipated by U.S. Patent No. 3,522,158, to Garnett et al.

The examiner's reasons in support of this rejection are as follows:

Applicants claim a polysaccharide grafted with an unsaturated monomer, said grafted polysaccharide being dispersible in water. Additional limitations in the dependent claims include specific unsaturated monomers and specific polysaccharides.

The Garnett et al. patent discloses graft polymers which preparation involves a hydrophilic backbone polymer being irradiated in the presence of a solution of a monomeric vinyl compound (see abstract). See column 1, lines 41–46 of the Garnett et al. patent wherein the backbone polymers include cellulose, any of its derivatives such as the aliphatic ethers and esters of cellulose which are hydrophilic. See column 2, 2nd paragraph of the Garnett et al. patent wherein examples of the monomeric vinyl compound are set forth which include styrene, methylmethacrylate, acrylonitrile, acrylamide, vinyl pyridines, vinyl carboxylic acids, and many others. The grafted polymers of the Garnett et al. patent anticipate the instantly claimed grafted polysaccharide when the polysaccharide is modified cellulose.

(Action, page 3)

Claims 30–34 are dependent upon claim 29, or upon a claim ultimately dependent upon claim 29. Claim 29 is now directed to a polysaccharide grafted with an unsaturated monomer, said grafted polysaccharide being dispersible in water and having a molecular weight lower than the molecular weight of the ungrafted polysaccharide.

The Garnett et al. patent discloses grafting onto a backbone polymer such as cellulose any monomeric vinyl compound which can be polymerized by free radical or ionic mechanisms (Abstract and column 1, line 41 to column 2, line 11). The grafted polymer, which comprises

both a cellulose [*i.e.*, polysaccharide] backbone and monomeric vinyl compound will have a molecular weight greater than the ungrafted cellulose [*i.e.*, polysaccharide]. Accordingly, as the grafted polysaccharide disclosed in the Garnett et al. patent does not have a molecular weight lower than the molecular weight of the ungrafted polysaccharide, a rejection of claim 29 under 35 U.S.C. § 102(b) as being anticipated by the Garnett et al. patent is untenable and should be withdrawn. As claims 30–34 are dependent upon claim 29, or upon a claim ultimately dependent upon claim 29, a rejection of claims 30–34 under 35 U.S.C. § 102(b) as anticipated by the Garnett et al. patent is also untenable and should be withdrawn.

**D. Response to Rejection of Claims 29, 35 and 36
Under 35 U.S.C. § 102(b) as being Anticipated by
United States Patent No. 3,461,052 to Restaino et al.**

The examiner's reasons in support of this rejection are as follows:

Applicants claim a polysaccharide grafted with an unsaturated monomer, said grafted polysaccharide being dispersible in water. Additional limitations in the dependent claims include specific unsaturated monomers and specific polysaccharides.

The Restaino et al. patent discloses graft copolymers wherein vinyl monomers are grafted onto hydrophilic polymeric substrates. See column 2, 1st paragraph wherein suitable substrates materials are listed, which include cellulose, wool, starch, alginic acid and the alginates, vegetable gums such, for example, as locust bean gum, guar flour, or gum tragacanth, gelatin, casein, pectin, polyvinyl alcohol, hydrophile high molecular weight polyalkylene glycols, and the like. Suitable vinyl monomers are listed in the 2nd paragraph of column 2, which include vinyl acetate, acrylic acid and its esters, methacrylic acid and its esters, acrylamide, acrylonitrile, styrene, vinyl toluene, vinyl pyridine, alkyl vinyl pyridines, divinyl benzene, butadiene, N,N-methylene bis-acrylamide, and the like. The grafted copolymers of the Restaino et al. patent anticipate the instantly claimed grafted polysaccharide when the polysaccharide is guar, cationic guar, nonionic guar, locust bean gum, xanthan gum and amylose.

(Action, pages 3–4)

Claims 35 and 36 are dependent upon claim 29, the subject matter of which is described above in Applicants' response to the rejection under 35 U.S.C. § 102(b) as anticipated by the Garnett et al. patent. Like the Garnett et al. patent, the Restaino et al. patent is directed to grafting by radiation vinyl monomers to hydrophilic polymeric substrates such as cellulose. As the Restaino et al. process grafts the vinyl polymer onto the cellulose [*i.e.*, the polysaccharide],

the grafted polysaccharide is intended to have a molecular weight higher than the ungrafted cellulose [polysaccharide].

The only statement in Restaino et al. about depolymerization is at column 3, lines 4–13 and relates to the [hydrophilic polymeric] cellulose substrate. Column 3, lines 4–13 read as follows:

Higher radiation doses, up to and even exceeding 10^8 roentgens may be employed. Obviously, if the substrate undergoes depolymerization or degradation under the effect of radiation and it is desired to retain the polymeric structure of the substrate the dose must be correspondingly limited. Thus, when grafting onto cellulose, excessive degradation is avoided by keeping the radiation dose below about 10^6 roentgens. Useful graft copolymers of cellulose degradation products may, however, be obtained by employing higher radiation doses.

As the use of radiation to depolymerize the cellulose substrate is not equivalent to the use of radiation to depolymerize the grafted polysaccharide of claim 29, a rejection of claim 29 under 35 U.S.C. § 102(b) as anticipated by the Restaino et al. patent is untenable and should be withdrawn. As claims 35 and 36 are dependent upon claim 29, a rejection of claims 35 and 36 under 35 U.S.C. § 102(b) as anticipated by the Restaino et al. patent is also untenable and should be withdrawn.

E. Response to Rejection of Claims 29, 33, 34 and 37
Under 35 U.S.C. § 102(b) as being Anticipated by
United States Patent No. 4,831,097 to Chuang et al.

The examiner's reasons in support of this rejection are as follows:

Applicants claim a cosmetic composition comprising a grafted [polysaccharide].

The Chuang et al. patent discloses a graft polymer that comprises on which is grafted a [quaternized] amino lactam, which was prepared by reacting a N-halomethyl lactam with a vinyl or acrylic compound having terminal tertiary amino groups. Chuang et al. discloses that the graft polymer is used in cosmetics (see Derwent Abstract), which anticipate[s] the instantly claimed cosmetic composition.

(Action, page 4)

Claims 33, 34 and 37 are dependent upon claim 29 or dependent upon a claim dependent upon claim 29. Claim 29 has been described in connection with the rejection under 35 U.S.C. § 102(b) as anticipated by the Garnett et al. patent.

Like the Garnett et al. patent, the Chuang et al. patent discloses the formation of a grafted polysaccharide having a molecular weight higher than the molecular weight of the ungrafted polysaccharide. More specifically, the Chuang et al. patent discloses a grafted polymer formed from the residue of a cellulosic polymer on which is grafted a cationic quaternized comonomer. The Chuang et al. process results in the production of a cellulose copolymer wherein the hydrogen atom of a hydroxy group of the hydroxylated cellulose is replaced with the quaternized amino lactam group. (See column 5, lines 16–19). Accordingly, as the molecular weight of the grafted polymer is necessarily higher than the molecular weight of the ungrafted polymer, the rejection of claims 29, 33, 34 and 37 under 35 U.S.C. § 102(b) as anticipated by the Chuang et al. patent is untenable and should be withdrawn.

F. Response to rejection of claims 21–28 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,522,158 to Garnett et al. in view of U.S. Publication No. 2001/0020090 to Becker et al.

The examiner's reasons in support of this rejection is as follows:

Applicants claim a method for grafting an unsaturated monomer onto a polysaccharide comprising the steps of: (1) forming a mixture comprised of an unsaturated monomer and a water soluble or water dispersible polysaccharide; (2) irradiating the mixture with an amount of electron beam radiation sufficient to form an unsaturated monomer-water soluble or water dispersible polysaccharide graft copolymer which is depolymerized relative to the ungrafted polysaccharide. Additional limitations in the dependent claims include specific unsaturated monomers and specific polysaccharides.

The Garnett et al. patent discloses a process for the production of graft polymers by ionizing radiation, wherein a hydrophilic backbone polymer is irradiated in the presence of a solution of a monomeric vinyl compound (see abstract). See column 1, lines 41–46 of the Garnett et al. patent wherein the backbone polymers include cellulose, any of its derivatives such as the aliphatic ethers and esters of cellulose which are hydrophilic, which embraces the instantly claimed water soluble and water dispersible polysaccharide. See column 2, 2nd paragraph of the Garnett et al. patent wherein examples of monomeric vinyl compound are set forth which include styrene, methylmethacrylate, acrylonitrile, acrylamide, vinyl pyridines, vinyl carboxylic acids, and many others. The instantly claimed method differs from the process of the Garnett et al. patent by claiming a depolymerization procedure. However, the Becker et al. patent shows that degradation of cellulose ethers with radiation is known in the art (see paragraph No. [0003]).

One of ordinary skill in this art would be motivated to combine the teaching of the Garnett et al. patent with the teaching of the Becker et al. patent since both patents set forth preparation of cellulose ether products using radiation.

PATENT

Serial No. 10/607,079; Filing Date: June 25, 2003
Examiner: Everett White; Art Unit: 1623
Attorney Docket No. Rhodia.02036 US

It would have been obvious to one of ordinary skill in the art at the time the invention was made to graft an unsaturated monomer such as vinyl compounds onto hydrophilic polymers such as a cellulose ether by irradiation as described in the Garnett et al. patent wherein the irradiation also result[s] in depolymerization of the cellulose ether in view of the recognition in the art, as suggested by the Becker et al. patent, that use of radiation for depolymerization of cellulose ethers can be carried out at a specific setting to obtain a desired solution viscosity of the resultant product.

(Action, pages 5–6)

All of claims 21–28 recite that the polysaccharide graft copolymer produced according to Applicants' claimed method has a molecular weight less than the molecular weight of the ungrafted polysaccharide. United States Patent Application Publication No. 2001/0020090 A1 to Becker et al. ("Becker et al. publication") relates to the depolymerization of cellulose ether. The Becker et al. publication does not disclose the formation of a polysaccharide graft copolymer by irradiation. As neither the Garnett et al. patent or the Becker et al. publication discloses, exemplifies or even suggests to one skilled in the art Applicants' claimed step of using irradiation to form a polysaccharide graft copolymer having a molecular weight lower than the molecular weight of the ungrafted polysaccharide, a rejection of claims 22–28 under 35 U.S.C. § 103(a) as being unpatentable over the Garnett et al. patent in view of the Becker et al. publication is untenable and should be withdrawn.

G. Response to rejection of claims 21–28 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 3,461,052 to Restaino et al. in view of U.S. Publication No. 2001/0020090 to Becker et al.

The examiner's reasons in support of these rejections are as follows:

Applicants claim a method for grafting an unsaturated monomer onto a polysaccharide comprising the steps of: (1) forming a mixture comprised of an unsaturated monomer and a water soluble or water dispersible polysaccharide; (2) irradiating the mixture with an electron beam radiation sufficient to form an unsaturated monomer-water soluble or water dispersible polysaccharide graft copolymer which is depolymerized relative to the ungrafted polysaccharide. Additional limitations in the dependent claims include specific unsaturated monomers and specific polysaccharides.

PATENT

Serial No. 10/607,079; Filing Date: June 25, 2003

Examiner: Everett White; Art Unit: 1623

Attorney Docket No. Rhodia.02036 US

The Restaino et al. patent discloses a process for the production of graft substrates by ionizing radiation, wherein a hydrophilic polymeric substrate is irradiated in the presence of a solution of a monomeric vinyl compound (see abstract). See column 2, 1st paragraph wherein suitable substrates materials are listed, which include cellulose, wool, starch, alginic acid and the alginates, vegetable gums such, for example, as locust bean gum, guar flour, or gum tragacanth, gelatin, casein, pectin, polyvinyl alcohol, hydrophile high molecular weight polyalkylene glycols, and the like. Suitable vinyl monomers are listed in the 2nd paragraph of column 2, which include vinyl acetate, acrylic acid and its esters, methacrylic acid and its esters, acrylamide, acrylonitrile, styrene, vinyl toluene, vinyl pyridine, alkyl vinyl pyridines, divinyl benzene, butadiene, N,N-methylene bis-acrylamide, and the like. The instantly claimed method differs from the process of the Restaino et al. patent by claiming a depolymerization procedure. However, the Becker et al. patent shows that degradation of a cellulose product (a polysaccharide) with radiation is known in the art (see paragraph No. [0003].

One of ordinary skill in this art would be motivated to combine the teaching of the Garnett et al. patent with the teaching of the Becker et al. patent since both patents set forth preparation of cellulose products using radiation.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to graft an unsaturated monomer such as vinyl compounds onto hydrophilic polymeric substrates by irradiation as described in the Restaino et al. patent wherein the irradiation also result[s] in depolymerization of the cellulose in view of the recognition in the art as suggested by the Becker et al. patent, that use of radiation for depolymerization of a cellulose can be carried out at [a] specific setting to obtain a desired solution viscosity of the resultant product.

(Action, pages 6–7)

All of claims 21–28 recite that the polysaccharide graft copolymer produced according to Applicants' claimed method has a molecular weight less than the molecular weight of the ungrafted polysaccharide. As noted above, the Becker et al. publication does not disclose the formation of a polysaccharide graft copolymer. As neither of the references relied on by the examiner discloses, exemplifies or even suggests to one skilled in the art Applicants' claimed step of using irradiation to form a polysaccharide graft copolymer having a molecular weight lower than the molecular weight of the ungrafted polysaccharide, a rejection of claims 21–28 under 35 U.S.C. § 103(a) as being unpatentable over the Restaino et al. patent in view of the Becker et al. publication is untenable and should be withdrawn.

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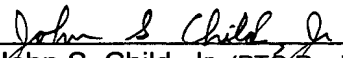
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IV Conclusion

It is believed that the above Amendment and Remarks constitute a complete response under 37 CFR § 1.111 and that all bases of rejection in the Examiner's Action have been adequately rebutted or overcome. A Notice of Allowance in the next Office Action is, therefore, respectfully requested. The examiner is requested to telephone the undersigned attorney if any matter that can be expected to be resolved in a telephone interview is believed to impede the allowance of pending claims 21–37 of United States Patent Application Serial No. 10/607,079.

Respectfully submitted,

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